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In the Matter of)	
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Review of the Commission's Rules Regarding)	
the Pricing of Unbundled Network Elements)	WC Docket No. 03-173
and the Resale of Service by Incumbent Local)	
Exchange Carriers)	
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DECLARATION OF JAMES H. VANDER WEIDE
SUBMITTED IN SUPPORT OF THE COMMENTS OF
THE VERIZON TELEPHONE COMPANIES

I. Introduction

1. I have been asked by Verizon to prepare a declaration in response to the

Commission's Notice of Proposed Rulemaking released September 15, 2003.[1/] The purpose of

my declaration is to present my expert opinion on issues related to the ILECs' risk of investing in

the facilities required to provide UNEs and the appropriate methods for calculating the cost of

capital input in UNE cost studies. Specifically, I will address the following questions:

- What specific risks do the ILECs face in providing UNEs under the UNE regime and

  TELRIC standard?

- How can the impact of these risks be measured and included in the cost of capital?

[1/] Notice of Proposed Rulemaking, *Review of the Commission's Rules Regarding the Pricing of Unbundled Network Elements and the Resale of Service by Incumbent Local Exchange Carriers*, WC Docket No. 03-173, FCC 03-224 (rel. Sept. 15, 2003) ("*NPRM*").

- If the Commission ultimately were to find that state commissions should consider an incumbent LEC's existing network in calculating investments and expenses, should they continue to base the cost of capital on the risks of a competitive market?

- Would the use of economic depreciation eliminate the need to separately compensate the incumbent LEC for the risk of stranded investment?

- What methods should be used to estimate the cost of equity?

- How should the cost of debt and capital structure be measured?

2. I conclude that the ILECs face three types of risk in providing UNEs under the UNE regime: (1) normal competitive market risk; (2) lease cancellation risk; and (3) sunk cost risk. ILECs currently face an additional regulatory risk due to the hypothetical assumptions underlying the existing TELRIC rules. For UNE rates to send correct economic signals for efficient entry and investment decisions and to provide an opportunity for ILECs to recover their forward-looking costs, these risks must be separately quantified and included in the cost of capital input in UNE cost studies.

3. I also conclude that: (1) the cost of equity should be estimated by applying the single-stage discounted cash flow ("DCF") model to a proxy group of S&P Industrial companies; (2) the cost of debt should be estimated from current yields on A-rated industrial bonds; and (3) the percentages of debt and equity in the capital structure should be estimated by the percentages of debt and equity in the market value capital structure of the S&P Industrials. Implementing these recommendations, along with my recommendations for estimating the effect of the relevant risks that are not included in market estimates of the cost of capital, will result in a cost of capital input that promotes efficient entry and investment and allows incumbents an opportunity to recover their forward-looking costs.

II.   Statement of Qualifications

4.   As a Professor at Duke University, I have taught courses in corporate finance, investment management, management of financial institutions, statistics, economics, and operations research, as well as a Ph.D. seminar on the theory of public utility pricing. I have also been active in executive education at Duke, directing and teaching in numerous executive programs. In addition to my teaching, I have written a book entitled, *Managing Corporate Liquidity: An Introduction to Working Capital Management*, and numerous articles and research papers on such topics as portfolio management, the cost of capital, capital budgeting, the effect of regulation on the performance of public utilities, and cash management. As an expert on financial and economic theory, I have testified on the cost of capital and other financial and economic issues in numerous proceedings. I hold a Ph.D. in finance from Northwestern University and a B.A. in economics from Cornell University. My academic background and my qualifications and experience as an expert witness are described in Attachment A.

III.   Economic Principles

5   The Commission determined the basic economic principles for setting rates for unbundled network elements ("UNEs") in its First Report and Order, *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, 11 FCC Rcd 15499 (1996) ("*Local Competition Order*"). In that order, the Commission decided that UNE rates should: (1) be based on forward-looking economic costs, not embedded or accounting costs; (2) approximate the rates the incumbent LECs would be able to charge in a competitive market for unbundled network elements; (3) send correct economic signals for efficient market entry and investment decisions; and (4) provide the ILECs an opportunity to recover their forward-looking economic costs of providing UNEs.

6.   In response to criticisms that the TELRIC standard has been implemented in a manner that "may work to reduce estimates of forward-looking costs below the costs that would actually be found even in an extremely competitive market," *NPRM* ¶ 51, the Commission now is considering whether its TELRIC pricing rules may have to be modified so as to create incentives for carriers to invest in their networks.

> Today, now that competition has taken root in many areas of the country, we initiate this proceeding to consider whether our pricing methodology is working as intended and, in particular, whether it is conducive to efficient facilities investment. To the extent that the application of our TELRIC pricing rules distorts our intended pricing signals by understating forward-looking costs, it can thwart one of the central purposes of the Act: the promotion of facilities-based competition. While our UNE pricing rules must produce rates that are just, reasonable and nondiscriminatory, consistent with the Act's goal of promoting sustainable competition, they should not create incentives for carriers to avoid investment in facilities.

NPRM ¶ 3.

7.   The Commission can best create incentives for carriers to invest in their networks by basing UNE rates on realistic estimates of the ILECs' forward-looking demand, operating expenses, economic depreciation, and investment and on a cost of capital input that reflects all the risks the ILECs face in providing UNEs under the Commission's UNE pricing rules, including competitive market risk, lease cancellation risk, sunk cost risk and any additional regulatory risk specific to the UNE pricing rules the Commission adopts. To create incentives for investment, the Commission must base UNE rates on realistic estimates of costs because competitive companies make investment and pricing decisions based on realistic estimates of their forward-looking costs, not hypothetical estimates of the costs of reconstructing all their facilities using the most efficient technology. The Commission similarly must base UNE rates on a cost of capital input that reflects all the risks the ILECs face in providing UNEs under the

Commission's UNE pricing rules because the ILECs will have no incentive to invest if they are not compensated for the risk they incur when they do invest.

IV. Risk

8.   *The Commission correctly recognizes that the ILECs will have no incentive to invest in network facilities if they are not compensated for the risks they face in making such investments under the Commission's UNE pricing rules.* My studies reveal that the ILECs face at least three distinct risks in providing UNEs: (1) competitive market risk; (2) lease cancellation risk; and (3) sunk cost risk. In addition, under the current hypothetical TELRIC regime, ILECs bear additional regulatory risk. The cost of capital input in UNE cost studies must compensate the ILECs for all these risks. As the Commission has previously recognized, "an appropriate cost of capital determination takes into account not only existing competitive risks...but also *risks associated with the regulatory regime to which a firm is subject.*"[2]

A. Competitive Market Risk

9.   Risk is defined as an exposure to an economic loss. For investment decisions, economic loss occurs when the company's expected rate of return on investment is less than the company's risk-adjusted cost of capital. Alternatively, economic loss occurs when the present value (PV) of future economic profits (revenues minus operating expenses minus economic depreciation) is less than the present value of the investments required to achieve the profits:

PV (revenues – operating expenses – economic depreciation) < PV (investments),

where the present values are calculated using the risk-adjusted cost of capital as a discount rate and management's best estimates of future economic profits and investments.

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[2]   Reply Brief in *Verizon* at 12 n 8. (emphasis added)

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1. Competitive Companies Have a Reasonable Opportunity to Earn Their Cost of Capital.

10.   Competitive companies have a reasonable opportunity to earn their cost of capital because competitive companies: (1) frequently achieve a short-term competitive advantage, and, hence, higher returns, through the introduction of new technologies; (2) set prices that reflect realistic revenue forecasts, realistic expense and investment forecasts, and realistic depreciation rates; (3) set prices that fully reflect competitive market risks; (4) set prices that reflect the risk that new entrants will enter the market with new lower-cost technologies; and (5) set prices that reflect the costs of transitioning to a new technology, should a new technology appear. In short, competitive companies price their products and services at levels that give them a reasonable opportunity to earn their cost of capital in the face of all these risks. If they cannot price products and services at these levels, they will simply decide not to invest.

2. The Cost of Capital Should Reflect Competitive Market Risk Even Under Reformed TELRIC Rules.

11.   The Commission asks whether it should continue to use a competitive cost of capital if it reforms TELRIC so that network assumptions more closely reflect attributes of the incumbent's existing network rather than the hypothetical network assumed under the current rules. *NPRM* ¶ 84. The short answer is that it should. Basing prices on the incumbent's existing network would not abandon the goal of setting prices that are consistent with those in a competitive market. As described in Verizon's comments, incumbents already face extensive intramodal and intermodal competition, and that competition will only increase going forward. The Commission must base the cost of capital on a realistic estimate of the level of competition over the life of the investment because ILECs make investment decisions using realistic estimates of forward-looking revenues, operating expenses, economic depreciation, and

investment that reflect the effect of future competition over the life of the investment. If the Commission were to base the cost of capital on estimates of the level of competition over a shorter period than the life of the investment, then it would send incorrect economic signals for entry and investment decisions.

12.   One of the Act's primary goals is to create incentives for investment in the network. In competitive markets, managers make investment and pricing decisions based on their best estimates of forward-looking revenues, operating expenses, economic depreciation, and investment considering the expected level of competition over the life of the investment. If prices are not sufficient to produce expected revenues that cover the company's forward-looking investments, expenses, and economic depreciation, considering the expected level of competition over the life of the investment, the company will not make the investment. Thus, the Commission can send correct economic signals to all market participants and allow the incumbent LECs an opportunity to recover their forward-looking cost of providing service only if it bases UNE rates on both: (1) _realistic_ estimates of the ILECs' forward-looking revenues, operating expenses, economic depreciation, and investment; and (2) a cost of capital that reflects the risks of a competitive market (as well as the lease cancellation and sunk cost risks discussed below).   .

13.   As I describe in further detail below, a cost of capital under the current TELRIC rules would be well _above_ the normal or "realistic" competitive cost of capital because it would need to reflect the regulatory risks created by a pricing methodology under which carriers set prices as though technologies were instantaneously and ubiquitously deployed. While reform of the pricing rules would mean that the cost of capital would no longer have to reflect the additional regulatory risks posed by TELRIC's current extreme assumptions, the more realistic

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approach still would have to reflect the real risks of a competitive market (as well as the cancellation and sunk cost risks posed by the UNE regime itself, which I discuss below).

3. Competitive Market Risk is Reflected in the Market Cost of Capital.

14.   Competitive market risk is included in estimates of the market cost of capital because: (1) a proxy group of companies operating in competitive markets is used to estimate the market cost of capital; (2) traditional cost of capital methodologies such as the DCF and CAPM are capable of measuring competitive market risk; and (3) competitive market risk is symmetric, i.e., competitive companies have a reasonable opportunity to earn their cost of capital. In contrast, the lease cancellation, sunk cost, and regulatory risks that I discuss below are not included in the market cost of capital. Lease cancellation and sunk cost risks are not included in the market cost of capital because they are associated with option contracts, and traditional cost of capital estimation techniques are incapable of measuring the risk of option contracts. Regulatory risk is not included in the market cost of capital because regulatory risk is asymmetric, i.e., the essence of regulatory risk is that the regulatory rules may prevent the regulated company from earning more than its cost of capital, but virtually guarantee that the company will earn less than its cost of capital.[3] I discuss the manner in which a market cost of capital can be estimated below.

B. Lease Cancellation Risk

1. The CLECs' Option to Cancel Is Valuable to the CLECs and Costly to the ILECs.

15.   The ILECs' risk of investing in the facilities required to provide UNEs is increased by the CLECs' option to cancel their UNE lease contracts at any time. The option to

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[3]   *See* A. Lawrence Kolbe and William B. Tye, "The *Duquesne* Opinion: How Much 'Hope' is There for Investors in Regulated Firms?" *Yale Journal on Regulation*, Volume 8, Number 1 (Winter 1991).

cancel is valuable to the CLECs because it allows them to turn what is essentially a fixed cost, i.e., the cost of building the network, into a variable cost. If demand turns out to be less than forecast, or a new technology arrives that allows the CLECs to bypass the ILEC's network and thus serve the customer at a lower cost, the option to cancel allows the CLECs to walk away from their use of the ILEC's network at no cost. If UNE rates are reduced by the regulator, the CLEC also has the option of canceling its existing lease and "renewing" the same UNEs at the new lower price in a new lease.

16.   The CLECs' option to cancel imposes a severe cost on the ILECs. If the CLECs build their own facilities, or use alternative facilities or technologies, the ILECs' revenues will decline, while their investment and operating expenses remain the same. Furthermore, the ILEC can never earn *more* revenue than projected since rates are based on the assumption of 100% demand. Thus, lease cancellation risk is asymmetric. The ILECs' cost in providing the CLECs the option to cancel must be recovered in the cost of capital input in UNE cost studies.

2. A Cancelable Operating Lease is More Risky to the Lessor than a Financial Lease.

17.   The risk associated with the CLECs' option to cancel can be analyzed by distinguishing between two types of leases. The financial lease is a long-term, non-cancelable lease, whose term is approximately equal to the expected economic life of the leased property. The lease payments in a financial lease are fixed for the life of the contract and must be sufficient to cover the original cost of the property, the operating expenses, and the cost of capital.

18.   The operating lease, on the other hand, is a cancelable lease that has an expected term much less than the expected economic life of the leased property. Under the operating lease, the lessee has the option to cancel the lease on short notice. The cancellation feature of the operating lease increases the risk that the lessor will be unable to recover its investment and earn

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a fair return on that investment. Thus, the lease payments on an operating lease must be larger than the lease payments on a financial lease. Indeed, they must be sufficient to compensate the lessor for the risk of economic loss if the lease cannot be renewed at rates that allow the lessor to earn its market cost of capital on the original investment.

3. The Higher Risk of Cancelable Operating Leases is Widely Recognized in the Financial Community.

19   The higher risk of cancelable operating leases is widely recognized in the financial community. Examples of such recognition include:

- Car lessors require significantly higher monthly lease payments on short-term operating leases than on longer-term financial leases.

- Wireless service providers offer lower rates for customers who are willing to sign longer-term, fixed-rate contracts.

- Independent power producers can only obtain financing to build new electric generation facilities if they can prove they have long-term purchase power agreements with utilities that commit utilities to purchasing power from the independent power producer over the life of the generating facilities. Without such agreements, the risks of building new generation facilities are simply too high to justify investment.

- Bond rating agencies consider interstate pipeline companies to have lower business risk if they have long-term, fixed-rate contracts for pipeline capacity.

4. Lease Cancellation Risk Is Not Reflected In the Market Cost of Capital.

20.   The cost of equity in UNE cost models is generally measured from cost of equity models such as the Discounted Cash Flow ("DCF") or Capital Asset Pricing Model ("CAPM") that are fundamentally incapable of measuring the risks associated with option contracts. These models cannot capture option risk because they are explicitly based on the assumption that investors are passive: once they buy a stock, they have no option to make further decisions based on updated information. Thus, the DCF and CAPM approaches simply do not quantify the impact of risks associated with option-like investments. The Commission must recognize the

failure of cost of equity models to quantify option-related risk when it establishes the framework

for setting the cost of capital input in UNE cost studies and provide for separate consideration of

this risk.

21.   That traditional cost of capital models such as the DCF and CAPM fail to account

for the value and risk of option contracts is widely recognized by financial professionals. For

example, in their text, *Principles of Corporate Finance*, 6th edition, Brealey and Myers state at

page 622:

> Discounted cash flow (DCF) implicitly assumes that firms hold real assets
> passively. It ignores the options found in real assets—options that sophisticated
> management can act to take advantage of. You could say that DCF does not
> reflect the value of management.
>
> Remember that the DCF valuation method was first developed for bonds and
> stocks. Investors in these securities are necessarily passive: with rare exceptions,
> there is nothing investors can do to improve the interest rate they are paid or the
> dividends they receive. A bond or common stock can be sold, of course, but that
> merely substitutes one passive investor for another.
>
> Options and securities which contain options, such as convertible bonds, are
> fundamentally different. Investors who hold options do not have to be passive.
> They are given a right to make a decision, which they can exercise to capitalize on
> good fortune or to mitigate loss. This right clearly has value whenever there is
> uncertainty. However, calculating that value is not a simple matter of
> discounting. Option pricing theory tells us what the value is, but the necessary
> formulas do not look like DCF.[4]

5. The Impact of Lease Cancellation Risk on the Cost of Capital Input Should Be Measured Using Standard Option Pricing Models.

22.   The Commission should estimate the impact of lease cancellation risk on the UNE

cost of capital by using the methodology described in an article by Copeland and Weston, "A

Note on the Evaluation of Cancellable Operating Leases," published in the Summer 1982 issue

of *Financial Management* and provided as Attachment B. This methodology is widely employed

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[4]   Richard A Brealey and Stewart C. Meyers, *Principles of Corporate Finance*, Irwin-McGraw Hill (6th Ed. 2000).

by financial analysts to value the options that are traded in financial markets and is more flexible than its predecessor, the Black-Scholes model. It is based on the assumptions that (1) the value of the underlying asset can either increase or decrease at discrete points in time, and (2) lessees can exercise the option to cancel their contract once they observe the new value of the underlying asset.[5] In the context of my analysis of lease cancellation risk, the binomial option pricing methodology suggested by Copeland and Weston is conservative because it assumes that the value of the network can either increase or decrease, whereas, under TELRIC, the value of the network is likely only to decrease as new lower-cost technologies become available.

23. In Attachment C, I describe in more detail how the required risk premium for lease cancellation can be estimated. I also apply this methodology to real world data for the state of California, as an example. Using this data, I demonstrate that the required risk premium for cancellation risk is approximately 400 basis points.

6. Long-Term Contracts Have Not Been Used to Reduce Risk Because UNE Rates Are Currently Non-Compensatory.

24. The *NPRM* asks whether long-term contracts have been used to reduce risk. *NPRM* ¶ 87. The financial community recognizes that long-term financial lease contracts are less risky to the lessor and more risky to the lessee. But such contracts are typically not used in the UNE market. Since long-term financial lease contracts are *more* risky to the lessee, the CLECs would generally be unwilling to sign long-term financial lease contracts unless they were offered a discount from current UNE rates. However, current UNE rates for *short-term* lease contracts do not reflect the *higher* risk associated with such arrangements. The ILECs cannot reasonably be expected to offer discounts for longer-term leases if the additional risk premium

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[5] *See* Thomas E Copeland and J. Fred Weston, "A Note on the Evaluation of Cancellable Operating Leases," *Financial Management*, Vol. 11(2) (1982).

for shorter-term leases is not reflected in the cost of capital input used in UNE cost studies. Thus, the only way to encourage long-term financial lease contracts is to include the risk premium arising from the CLECs' ability to cancel their lease on short notice in the cost of capital input in UNE cost studies.

C. Sunk Cost Risks

25.   The third risk that needs to be included in the cost of capital input in UNE cost studies is sunk cost risk. Sunk cost risk arises because an investment in the ILECs' telecommunications network, once made, is largely irreversible. If demand turns out to be less than forecast or technologies are developed that make alternative networks more economical than the ILECs' networks, the ILECs will lose most of the money they have invested. To reduce this risk, many companies operating in competitive markets delay investment until more information about competition, technological change, and other risk factors is available. However, once the ILECs make their investment, they give up the option to delay. By contrast, a CLEC has the option simply to lease UNEs and see how market and technology conditions evolve: it can make a later choice as to whether to invest in its own facilities, continue leasing, or simply exit the market altogether. The valuable option to delay, which the ILEC provides to the CLEC, must be recognized in the cost of capital input because the ILEC bears the entire risk of sunk costs.

26.   The risks associated with sunk costs are widely recognized in the financial and economics literature. An early paper by MacDonald and Siegel, "The Value of Waiting to Inves" in *Quarterly Journal of Economics*, 101, 707-728, and the book by Dixit and Pindyck, *Investment Under Uncertainty*, published by Princeton University Press are excellent sources on

the value of the option to delay investment and the risks associated with foregoing this option.[8] In addition, Professor Pindyck has written a working paper entitled "Mandatory Unbundling and Irreversible Investment in Telecom Networks," (attached to his declaration submitted with Verizon's comments) that applies option pricing theory to the ILECs' irreversible investment in telecommunications networks.

27.   There are also abundant real world examples of the risks of making huge fixed investments in a telecommunications network when demand is uncertain and technological change is rapid. Over the last several years, companies such as Global Crossing, Qwest, Teligent, Allegiance, Covad, Rhythms, Level 3, Metromedia Fiber Network, Williams Communications, McLeodUSA and others have invested billions of dollars in constructing telecommunications networks both here and abroad. These companies have found that telecommunications demand was not as large as they had originally forecast, and advances in technology may soon make some parts of their networks obsolete. As a result, these companies have lost anywhere from 80% to 100% of their market value as investors have come to realize that these sunk cost investments were made based on overly optimistic demand and cost forecasts.

28.   As with cancellation risk, sunk cost risk is not compensated in the competitive market cost of capital because traditional cost of capital methodologies do not consider option-related risk. The economics literature recognizes that the cost of capital for investment decisions involving sunk and irreversible costs must include a risk premium for sunk cost risk. Professor

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[8]   _See_ Robert McDonald and Daniel Siegel, "The Value of Waiting to Invest," _Quarterly Journal of Economics_, Vol. CI, 155 4 (Nov. 1986); Avinash K Dixit and Robert S. Pindyck, Investment Under Uncertainty, Princeton University Press (1994).

Pindyck further discusses the risks associated with sunk and irreversible costs in his separate declaration in this proceeding.

D. Regulatory Risk

1. The Commission's Current TELRIC Rules Preclude the ILECs from Recovering Their Actual Forward-Looking Economic Costs.

29.   Regulatory risk arises under the Commission's existing UNE pricing rules because rates are set to reflect the forward-looking investment and operating expenses of reconstructing the incumbent LEC's telecommunications network at a single point in time using the most efficient network design and technology at the time rates are set. Yet, as Dr. Shelanski explains, no real-world carrier in a competitive market could instantaneously and ubiquitously deploy a network with the newest technologies, nor would prices be set based on such a hypothetical construct. Moreover, if network assets are depreciated over a period of 15 to 20 years, but UNE rates are reset every few years to reflect the cost of reconstructing and operating yet another new, supposedly more efficient network, the incumbent LEC will have no opportunity to recover the cost of its initial network (or of the new network assumed each time the rates are reset).

30.   In addition, state commissions have frequently used the requirement that rates must reflect the cost of reconstructing the network using the most efficient technology to justify cost inputs in UNE cost models that are significantly below the costs that even an efficient competitor would face in a real world competitive market. For example, state commissions often assume that the incumbent LEC: (1) can operate the telecommunications network at a very high fill factor because the level of demand is known with certainty; (2) can purchase all switches at a low discounted cost because of new switch discounts; (3) would incur no transition cost to replace its network with the latest advance in technology at each moment in time; and (4) will

not experience any loss in revenues when CLECs serve customers from their own facilities. Since these cost inputs produce estimates of forward-looking economic costs that are significantly below reasonable estimates of the ILECs' actual forward-looking economic costs under competitive conditions and efficient management, the ILECs will have no opportunity to recover their forward-looking costs.

31.   Regulatory risk is exacerbated by the successive resetting of rates to reflect the supposedly lower cost of a new hypothetical network. Suppose that the incumbent LEC's initial UNE rates are based on the assumption that the incumbent LEC could reconstruct its network by committing to a stream of TELRIC costs, including operating expenses and investment, which have a discounted present value of $15 billion. Clearly, for the incumbent LEC to earn a fair rate of return on its investment, UNE rates must be set so that the present value of the incumbent LEC's expected lease revenues will also be $15 billion.

32.   Now suppose that in a new pricing proceeding, rates are reset based on the assumption that a hypothetical network using the then-latest telecommunications technology could be reconstructed once again, at a lower discounted present value of $12 billion. Of course, in reality, the incumbent LEC would not find this second reconstruction of its network to be economically attractive because it would incur a large investment just to achieve a relatively small savings in operating expenses. However, since TELRIC rates are based on the forward-looking economic cost of the most efficient current technology, the incumbent LEC's UNE rates will be reduced to a level where the present value of future lease revenues is $12 billion. Since the present value of the incumbent LEC's expense and investment is fixed at $15 billion, the incumbent LEC will not be able to recover the forward-looking economic cost of the network it was presumed to have constructed when UNE rates were initially set. Importantly, this analysis

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uses TELRIC costs, not actual costs, as a starting point. Therefore, it *does not capture* the additional regulatory risk associated with the fact that the TELRIC standard denies recovery of actual forward-looking costs. (As I discuss below, some, but not all, of this risk could be alleviated through the use of accelerated depreciation if that were done correctly.)

33.   The economic implication of the above example is that, under the TELRIC standard, the expected present value of the incumbent LEC's lease revenues will almost certainly be less than the expected present value of the incumbent LEC's TELRIC network expenses and investment. In terms of the previous example, the present value of the incumbent LEC's revenues will equal only $12 billion once rates are reset. Yet, once the incumbent LEC reconstructs its network the first time, the present value of the incumbent LEC's network expenses plus investment are fixed at $15 billion. As shown in Table 1 below, assuming a 50/50 probability that rates are reduced when they are reset (which is extremely conservative, given the experience since passage of the Act), the expected value of the incumbent LEC's stream of lease payments will equal $13.5 billion, but its TELRIC expenses will still be $15 billion.[2] Thus, the expected (i.e., probability-weighted) present value of the incumbent LEC's revenues will be less than the present value of its TELRIC expenses.

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[2]   For simplicity, we have ignored that the company would receive $15 billion until rates were re-set, and would then receive a lesser amount until rates were re-set again. The point of the example is unaffected by this simplification: the expected present value of revenues is significantly less than the expected present value of expenses plus investment

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Table 1

**Present Value of Lease Revenues and TELRIC Costs
With and Without Arrival of New Lower-Cost Technology**

Outcome	Probability	PV Revenues	PV Expenses Plus Investment
No new technology	0.5	$15B	$15B
New technology	0 5	$12B	$15B
Expected value[8/]		$13 5B	$15B

2. The ILECs' Inability to Recover their Forward-Looking Economic Costs Under the TELRIC Standard is Widely Recognized.

34.   That the ILECs will not recover their forward-looking economic costs under the

TELRIC standard is widely recognized in the economics literature. In a recent working paper

prepared by the FCC's Office of Strategic Planning and Policy Analysis, for example, Mandy

and Sharkey evaluate the use of static cost proxy models such as TELRIC in setting forward-

looking prices for UNE services   They conclude that TELRIC will not allow the ILECs to

recover their forward-looking cost of providing UNE services:

> When TELRIC prices are recomputed at intervals shorter than asset lives, the firm
> will generally not earn the target rate of return. In these cases, a correction factor
> must be applied to the TELRIC price path in order for revenues to exactly recover
> investment cost, including the target rate of return.[9/]

Two other papers by Mandy reach similar conclusions: "TELRIC Pricing with Vintage Capital,"

Journal of Regulatory Economics, 22:3 (2002) and "Pricing Network Elements When Costs Are

Changing," *Telecommunications Policy* 26 (2002).

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[8]   The expected value is the probability weighted average of the two outcomes. Thus, the expected PV
revenues equals 5(15) + .5(12) = $13.5B.

[9/]   David M Mandy and William W Sharkey, "Dynamic Pricing and Investment from Static Proxy Models,"
Review of Network Economics, Vol. 2, Iss. 4 (Dec 2003) (abstract)

3. Regulatory Risks Created By TELRIC Are Not Reflected in the Market Cost of Capital.

35.   There are two basic reasons why these regulatory risks created by TELRIC are not included in the market cost of capital. First, as previously noted, the market cost of capital must necessarily be measured by applying cost of equity models to market data for a proxy group of companies. However, the regulatory risk of the TELRIC regime cannot be reflected in the cost of capital estimates of any real world proxy group because there are no proxy companies whose sole business is to build telecommunications networks for the purpose of selling UNEs at TELRIC rates.

36.   Second, the market cost of capital is defined as the _expected_ rate of return on investment, whereas the essence of regulatory risk is that investors will not earn the expected rate of return on investment on average over time. For investors to have a reasonable opportunity to earn their expected rate of return on investment in the presence of regulatory risk, the regulatory body must allow a _nominal_ rate of return that exceeds the _expected_ rate or return, or cost of capital. In this regard, the impact of regulatory risk is similar to the impact of bankruptcy risk on investors' required yield on junk bonds. The nominal yield on these bonds must be significantly higher than the expected return in order for investors to have a reasonable opportunity to earn their expected rate of return.[10]

37.   Because the regulatory risks created by the UNE pricing rules are not reflected in the market estimated cost of capital, the impact of regulatory risk must be separately measured and included as an additional premium to the estimate of the market cost of capital. In particular, to the extent the Commission (incorrectly) retains the hypothetical assumptions concerning

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[10]   Kolbe and Tye, _supra_ note 3.

replacement and network configuration that underlie the current TELRIC rules, it must include an additional risk premium to reflect the risks created by those rules.

38.   The papers by Mandy and Sharkey cited above provide some guidance on the extent to which the cost of capital input in UNE cost studies must be increased above the market cost of capital in order to allow the ILECs an opportunity to recover their forward-looking economic cost of providing UNEs under current TELRIC rules. For example, with regard to switching costs, these papers indicate that the FCC's current rules may understate cost recoveries by 24% to 50%. Because the Commission should reform its TELRIC rules so that they more closely reflect the ILEC's actual forward-looking costs and therefore do not create the additional regulatory risks discussed in this subsection, I have not attempted to quantify a further risk premium to account for these risks.

E. Use of Economic Depreciation Does Not Eliminate the Need to Account for These Competitive and Regulatory Risks in the Cost of Capital.

39.   The use of economic depreciation would not reduce competitive market risk because competitive market risk is measured by applying traditional cost of capital methodologies to a proxy group of competitive companies, and competitive companies already use economic depreciation in making investment and pricing decisions. The use of economic depreciation would not eliminate either lease cancellation or sunk cost risk because the CLECs would still have the option to cancel the lease, and the ILECs would still forego the option to delay investment until new information becomes available. Finally, as long as the Commission continues to require pricing rules that use hypothetical or optimistic assumptions and depreciation lives that are greater than the expected time between rate reviews (to the extent the latter is not fully addressed through accelerated depreciation), the ILECs will continue to experience regulatory risk. As Mandy and Sharkey state in the paper cited above, "When

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TELRIC prices are recomputed at intervals shorter than asset lives, the firm will generally not earn the target rate of return."[11/]

V.   Market Cost of Capital

40.   The Commission must begin its determination of the UNE cost of capital by estimating the market cost of capital. It must then calculate a risk premium for the additional risks the ILECs face in providing UNEs. The market cost of capital is a weighted average of the cost of debt and cost of equity, where the weights are the percentages of debt and equity in the company's capital structure. Since there are no market-traded companies that are solely in the business of providing UNEs, the market cost of capital must be estimated from market data for a proxy group of companies of comparable risk. Thus, to estimate the market cost of capital, the Commission must: (1) select a group of risk proxy companies; (2) estimate the proxy companies' cost of debt; (3) estimate the proxy companies' cost of equity; and (4) estimate the percentage of debt and equity in the proxy companies' capital structure.

A. Proxy Companies

41.   The following four criteria are essential to the selection of a reasonable proxy group for estimating a market cost of capital: (1) the companies must have stock that is market traded; (2) the companies must have sufficient data to apply cost of equity methodologies, *i.e.*, dividends and I/B/E/S growth rates; (3) taken as a whole, the group of companies must reflect the average competitive market risk; and (4) the group of companies must be sufficiently large in number to reduce random noise in the estimation process to an acceptable level. The first two of these criteria are required to apply the cost of equity methodologies to each company and obtain

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[11/]   David M. Mandy and William W. Sharkey, Dynamic Pricing and Investment from Static Proxy Models, Review of Network Economics, vol. 2, Iss 4 at 437 (Dec. 2003).

data on their market value capital structures; the third is required to ensure the cost of equity reflects the relevant risk; and the fourth is required to assure that the cost of equity estimate is a reasonable measure of the target company's true cost of capital.

42.   The S&P Industrials are an excellent proxy for the purpose of estimating the market cost of capital. The Commission has stated that UNE rates should approximate the rates the ILECs would be able to charge in a competitive market for UNEs. The only way that rates can approximate the rates the ILECs would be able to charge in a competitive market is for the cost of capital input in UNE cost studies to reflect the risks of operating in competitive markets. The goal of estimating the market cost of capital is to capture generally the risks of operating in a competitive market. Because the S&P Industrials are a quintessential group of companies operating in competitive markets, their cost of capital reflects competitive market risk.

43.   In addition, as Verizon explains in its Comments, there is abundant evidence that the ILECs face actual and potential competition from facilities-based CLECs and alternative technologies providers, including wireless carriers, cable operators, data providers, and VoIP providers. Thus, the competitive market of the S&P Industrials is a reasonable proxy for the competitive market risks of the wholesale UNE business.

44.   CLECs have often argued that the Regional Bell Holding Companies ("RBHCs") are the best proxy group for estimating the UNE cost of capital because the RBHCs are telecommunications holding companies whose wireline subsidiaries are wholesale providers of UNEs. However, there are at least three reasons why the RBHCs are poor proxies for the purpose of estimating the cost of capital input in UNE cost studies. First, the RBHCs are less risky than the wholesale UNE provider because they can diversify away many of the technology, geographic, and regulatory risks that the UNE provider faces when it invests in the network to

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provide UNEs. The ability to diversify arises when the returns on two investments are negatively correlated. The returns on the RBHCs' wireline and wireless investments are clearly negatively correlated because wireless is a direct substitute for wireline service, with many customers using wireless instead of wireline phones. Thus, the risk the RBHCs' wireline subsidiaries face that they may lose traffic and customers to wireless providers is offset to some degree by the fact that some of that traffic and some of those customers simply will move to the RBHCs' wireless subsidiaries, and the RBHCs therefore will retain the resulting revenue.

45.   The RBHCs' ability to diversify the technology risks of their wireline investments through their investments in wireless technology can be measured by calculating the covariation between the wireline and wireless components of the RBHCs' businesses. The wireline and wireless components of the RBHCs' businesses will have negative covariation if the revenues and income of the wireless component increase when the revenues and income of the wireline component decrease. I have estimated the covariation between the RBHCs' wireline and wireless businesses to be negative 0.52, strong evidence supporting the conclusion that the RBHCs are able to diversify some technology risk and thus are less risky than a UNE provider.

46.   Second, the three remaining RBHCs that still pay dividends are simply too small a sample for the purpose of reliably estimating the cost of equity. Economists recognize that the cost of equity should be measured from a large sample because there is a certain amount of random noise in the results of applying cost of equity models to individual companies, and this random noise for individual companies can be significantly reduced by using a large sample of companies such as the S&P Industrials.

47.   Third, traditional cost of equity models cannot be reliably applied to companies such as the RBHCs that are experiencing dramatic industry restructuring. The DCF model

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requires reliable estimates of a company's future growth prospects, and the CAPM requires reliable estimates of a company's future beta. However, because of industry restructuring, future growth prospects and future estimates of beta for the RBHCs are highly uncertain. Cost of equity estimates based on these uncertain values are too unreliable to be used as the basis for the cost of capital input in UNE cost studies.[12]

B. Cost of Debt

1. The Cost of Debt Should Be Estimated By the Yield to Maturity on A-rated Industrial Bonds.

48. Economists define the cost of debt as the market interest rate that a firm would have to pay on newly-issued debt obligations. Since companies do not participate in the debt markets on a continuous basis, they measure the cost of debt from interest rate data on companies of comparable risk. With regard to debt investments such as bonds, risk is measured by the company's bond rating. Thus, economists measure a company's cost of debt using yield to maturity data on bonds of companies with the same debt rating. Because the S&P Industrials, on average, have an A bond rating, I recommend that the cost of debt be measured using the yield to maturity on A-rated industrial bonds. An additional amount of approximately ten basis points must be added to the yield to maturity on A-rated industrial bonds to account for debt flotation costs.

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[12]   The high uncertainty in the future growth prospects for the RBHCs is evidenced by the high standard deviation of analysts' growth forecasts for these companies. Growth forecasts are generally considered to be unreliable when the standard deviation is greater than the mean, and the standard deviation of analysts' long-term growth forecasts for BellSouth, SBC, and Verizon are all significantly higher than the mean forecasts for these companies. The ratio of the standard deviation to the mean is called the coefficient of variation. In November 2003, the coefficient of variation for BellSouth was 1 21, for SBC, 5.99, and for Verizon, 3.69.

2. The Cost of Debt Component Should Not Reflect Short-term Debt Because Short-term Debt is Used to Finance Working Capital, and Working Capital Is Not Included in UNE Cost Studies.

49.   CLECs have sometimes argued that the cost of debt component of the UNE cost of capital should reflect a mix of both short- and long-term interest rates because the ILECs use both short- and long-term debt to finance their investments in network facilities. This argument reflects a basic misunderstanding of how the ILECs finance their investments and how UNE costs are calculated. The ILECs primarily use short-term debt to finance working capital requirements, including investment in inventories and receivables. Short-term debt is generally not used to finance investments in long-term assets such as the ILECs' investment in telecommunications network facilities. In addition, working capital is not included in the investment component of UNE costs. Thus, it would be inconsistent to include short-term debt in the capital structure when short-term debt is used to finance working capital that is not included in the investment component of UNE costs.

50.   CLECS have also argued that the cost of debt should be measured from data on the average yield to maturity on the ILECs' outstanding debt. This argument is also incorrect. The ILECs' outstanding debt includes many long-term issues that are priced as short-term debt because they are nearing maturity. The fact that these long-term debt issues are now priced as short-term debt does not change in any way the interest rate that the ILECs have to pay on these issues. Thus, the ILECs' actual cost of debt is not reflected in the yield to maturity on long-term debt issues that are now priced as short-term debt. Furthermore, as noted above, it is not appropriate to include short-term debt for the purpose of calculating the UNE cost of capital because short-term debt is used to finance working capital, and working capital is not included in UNE cost studies.

C. Cost of Equity

51.   Economists define the cost of equity as the return investors expect to receive on alternative equity investments of comparable risk. Since the return on an equity investment of comparable risk is not a contractual return, the cost of equity is more difficult to measure than the cost of debt. There is agreement, however, that the cost of equity is significantly greater than the cost of debt because investors face higher risk when they invest in a company's stock than in a company's bonds. There is also agreement among economists that the cost of equity, like the cost of debt, is both forward-looking and market based.

1. The Commission Should Estimate the Cost of Equity By Applying the Single-Stage Discounted Cash Flow Model to the S&P Industrials.

52.   The cost of equity is generally measured from market models such as the discounted cash flow ("DCF") model. The DCF model is based on the assumption that the market price of a firm's stock is equal to the present value of the stream of cash flows that investors expect to receive from owning the stock. The cost of equity in the DCF model is the discount rate that equates the firm's stock price to the present value of the future stream of cash flows investors expect from owning the stock.

53   To simplify the mathematics of the DCF model, economists frequently assume that future dividends will grow at a constant rate, g. Under this assumption, the cost of equity can be found from the simple formula, $k = D_1 \div P_0 + g$, where k is the cost of equity, D_1 is the expected next year dividend, P_0 is the current stock price, and g is the expected long-run dividend or earnings growth rate.[13] Estimating a company's cost of equity from the DCF model thus amounts to estimating the investor's expected dividend yield and growth rate.

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[13]   When companies pay quarterly dividends, the D_1 in this formula would be the end of year future value of the four quarterly dividend payments during year one.

54. In applying the DCF model, it is important to recognize that the cost of equity depends on investor expectations, not the expectations of the individual analyst. It is also important to recognize that the cost of equity depends on investors' expectations at the time the stock is purchased. Whether this expectation turns out to be optimistic or pessimistic after the fact is irrelevant.

55. Economists frequently use the I/B/E/S mean long-term growth rates in the DCF model as a surrogate for investors' growth expectations because they: (1) are widely circulated in the financial community; (2) include the projections of a large number of reputable financial analysts who develop estimates of future growth; (3) are reported on a timely basis to investors; and (4) are widely used by institutional and other investors. In addition, there is considerable empirical evidence that analysts' forecasts as reported by I/B/E/S are more highly correlated with stock prices than a firm's historical growth rates, implying that investors actually use these forecasts to make stock buy and sell decisions.[14]

56. CLECs have frequently objected to the use of the single-stage DCF model on the grounds that the I/B/E/S growth rates are sometimes greater than the expected long-term growth of the economy as a whole, and it is irrational for investors to believe that a company could grow faster than the economy as a whole forever. This argument is flawed in three respects. First, as noted, the cost of capital depends on *investors'* growth expectations, not the growth expectations of the analyst performing the study. Thus, for the purpose of calculating the cost of equity, it only matters that the growth rates used in the model actually reflect investors' growth

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[14] *See* James H. Vander Weide and Willard T. Carleton, "Investor Growth Expectations. Analysts vs. History," *The Journal of Portfolio Management* (Spring 1988); Burton G. Malkiel and John G. Cragg, "Expectations and the Structure of Share Prices, University of Chicago Press (1982); David A. Gordon, Myron J Gordon, and Lawrence I. Gould, "Choice Among Methods of Estimating Share Yield," *The Journal of Portfolio Management* (Spring 1989)

expectations. In this regard, as noted above, there is substantial evidence that investors actually use I/B/E/S growth rates in making stock buy and sell decisions.

57.   Second, the single-stage DCF Model is a reasonable basis to estimate a cost of equity, even if firms cannot grow at rates exceeding the GNP growth rate forever. Recall that the DCF model assumes that the price of a company's stock is equal to the discounted value of its future stream of dividends. Because future dividends are discounted at a rate, k, that exceeds the growth rate, g, dividends beyond a specific finite period have very little impact on the firm's stock price and therefore on the result produced by the single-stage DCF model.

58.   Third, the I/B/E/S growth rates are consistent with other indicators of investors' long-term growth expectations, such as internal growth estimates using Value Line data. Analysts define internal growth as the product of the company's rate of return on equity, r, and its retention ratio, b. Internal growth is considered to be an estimate of long-term growth because it is sustainable as long as the company's rate of return on equity and its retention ratio remain approximately the same. In November 2003, Value Line's average internal growth rate for the S&P 500 is 11.63%, as compared to the 11% average I/B/E/S long-term growth estimate for these companies.

2. The Three-Stage DCF Model Should Be Rejected Because It Produces Results that Are Inconsistent with the Principle that High-Risk Companies Should Have Higher Costs of Capital than Low-Risk Companies.

59.   As an alternative to the single-stage DCF model, CLECs such as AT&T and MCI often have proposed a three-stage DCF model in which companies are expected to grow at an initial growth rate for five years, a second set of growth rates for the next 15 years, and then grow at an estimated economy-wide growth rate forever. Although the results of the three-stage DCF model are sensitive to the three assumed growth rates and the assumed length of the three

periods, the CLECs provide no evidence that investors expect growth to proceed in the three-stage pattern they assume in their model. A more fundamental problem with the three-stage DCF model is that the model often produces results that are inconsistent with the basic principle that investors require a higher rate of return on investments with greater risk.

60.   In testimony before various commissions, I have demonstrated that the three-stage DCF model with the inputs recommended by AT&T and MCI produces the illogical result that *higher* risk companies have a *lower* cost of equity than lower risk companies.[15] Thus, for example, the CLECs' three-stage DCF model typically produces a higher cost of equity for electric and natural gas distribution companies than the S&P Industrials. Furthermore, their three-stage DCF model often produces the illogical result that *high-risk* companies with higher betas, higher expected growth, and lower dividends have *lower costs* of equity than low-risk companies with low betas, lower expected growth, and high dividends. In contrast, I have demonstrated that the single-stage model does not produce these aberrational results.

61.   I have also demonstrated the unreasonableness of the three-stage DCF model CLECs often propose by performing a regression analysis to determine whether, in order to value companies, investors actually use the I/B/E/S growth rates, rather than the average growth rate assumed in the CLECs' three-stage model.[16] A company's price-to-earnings ratio reflects the growth rates investors use in determining the value of a company and thus the two factors should be significantly and positively correlated. However, the use of the average of the three-stage growth rates in the regression equation produces no correlation with company price-to-

[15]   *See, e.g.*, FCC File No. EB-02-MD-006, *In the Matter of WorldCom, Inc., Complainant, v. Verizon New England Inc., Bell Atlantic Communications, Inc.* (d/b/a Verizon Long Distance), NYNEX Long Distance Company (d/b/a Verizon Enterprise Solutions), Verizon Global Networks, Inc., Defendants., Exhibit 8, Rebuttal of Dr. James Vander Weide on Behalf of Verizon MA, at 82-87; Surrebuttal of Dr. James Vander Weide on Behalf of Verizon MA, at 38-46

[16]   *See, e g.*, Exhibit 8, Surrebuttal of Dr James Vander Weide on Behalf of Verizon MA, at 44-46.

earnings ratios and the illogical result that *high* growth companies would have *lower* price-to-earnings ratios. In contrast, the I/B/E/S growth rates used in the single-stage model are highly and positively correlated with price-to-earnings ratios.[17]

62.   Finally, I have demonstrated the unreasonableness of the CLECs' three-stage DCF model by comparing the results of this model to the costs of capital that CLECs such as AT&T and MCI themselves use to make network investment decisions. As Verizon explained in the Virginia Arbitration proceeding, the CLECs' three-stage DCF model, in combination with their recommended cost of debt and capital structure, produced a weighted average cost of capital that was significantly lower than the weighted average cost of capital these companies themselves used to make investment decisions.

3. The Commission Should Not Use the Capital Asset Pricing Model ("CAPM") to Estimate the Cost of Capital Input in UNE Cost Studies.

63.   In the Virginia Arbitration Order, the Wireline Competition Bureau used the CAPM to estimate the cost of equity component of the cost of capital input in UNE cost studies. The CAPM is an equilibrium model of the security markets in which the expected or required return on a given security is equal to the risk free rate of interest, plus the company equity "beta," times the market risk premium:

Cost of equity = Risk-free rate + Equity beta x Market risk premium,

where the market risk premium is the difference between the expected rate of return on the stock market as a whole and the risk-free rate. The risk-free rate in this equation is the expected rate of return on a risk-free government security, the equity beta is a measure of the company's risk relative to the market as a whole, and the market risk premium is the premium investors require

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[17]   *See id.* at 46.

to invest in the market basket of all securities compared to the risk-free security. The CAPM requires estimates of each of these factors, the risk-free rate, the company-specific risk factor or beta, and the expected return on the market portfolio.

64. The CAPM is a theoretical model of capital market equilibrium based on certain simplifying assumptions about how investors behave, their beliefs about the probability distributions of returns on different securities, and the available opportunities in the market place. On the basis of these simplifying assumptions, the CAPM concludes that investors are sensitive to only one risk factor, how a company's stock varies in proportion to movements in the market as a whole. Relaxing the assumptions in the CAPM in the direction of more realism leads to new capital market equilibrium models that incorporate additional risk factors which affect the cost of equity. Using a single-factor model such as the CAPM, when the cost of equity actually depends on multiple risk factors, introduces a bias into the estimate of the cost of equity. Unfortunately, financial economists are in considerable disagreement about which risk factors should be included in multi-factor capital market models.

65. In addition to the fact that the CAPM does not capture all the risks that affects the cost of equity, there are significant problems in estimating the model's basic parameters, the risk-free rate, the beta, and the expected return on the market portfolio. Because the CAPM is a single-period model, it gives no guidance on the time frame that should be used to measure the risk-free rate. Furthermore, since the CAPM is, in theory, forward looking, the beta factor is supposed to reflect the co-variation between the *expected* return on security i in the single period and the *expected* return on the market portfolio in that single period. Thus, beta is a hypothetical construct measured from returns in hypothetical future states.

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66. In practice, an analyst is generally confined to the use of historical data in measuring beta, a severe restriction when the risk of the candidate firm is changing dramatically. In addition, the use of historical data can provide misleading results. If a random shock such as industry restructuring causes the risk of a company to increase, its stock price, and thus, its historical return, will decline. If the decline in historical returns occurs at a time when the general stock market is increasing, the company's measured beta will decline at a time when the fundamental risk of the business is increasing.

67. Measuring the expected return on the market portfolio, or, equivalently, the market risk premium, is also a difficult task. In general, there are two approaches to measuring the expected market risk premium. First, one can calculate the expected return on the market using a methodology such as the DCF model applied to the S&P 500, and subtract the interest rate on a risk-free investment. This approach means that, since the DCF model is used to measure the expected risk premium, the CAPM application is essentially a DCF application, especially for firms whose betas are very close to 1.0.[18] A second approach is to measure the expected risk premium on the market portfolio from historical data on earned returns on stock and bond portfolios. This approach is subject to the criticism that historical returns may not reflect future expected returns.

4. If the CAPM Is Implemented, It Should Be Implemented Using Long-term Interest Rates, a Beta Greater than 1.0, and a Market Risk Premium Calculated Using the Single-stage DCF Model.

68. When all these complications are considered, the Commission should not estimate the cost of equity component of the UNE cost of capital using the CAPM. However, if the

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[18] If beta is equal to 1 0, the CAPM cost of equity equals the risk-free rate plus the DCF expected return on the market portfolio minus the risk-free rate. Thus, when a company's beta is equal to 1.0, the CAPM result is exactly the same as the DCF result for the market portfolio.

Commission feels obliged to apply the CAPM, three observations are in order. First, because stocks are long-term investments, the Commission should use the yield to maturity on long-term Treasury bonds as an estimate of the risk-free rate of return. The yield to maturity on long-term Treasury bonds is a close approximation of the risk-free rate over the long horizon considered by stock investors, while the yield to maturity on short-term Treasury bills is not. Treasury bills are not risk-free over the long-term horizon considered by equity investors because the amounts invested in Treasury bills will have to be reinvested at unknown short-term rates at frequent intervals over the long term.

69. Second, the Commission should use a beta that is greater than 1.0. While it is not possible to measure a UNE cost of equity beta from stock market data on a company whose sole business is to provide UNEs, we do know that the Commission intends that UNE rates approximate the rates the ILECs would be able to charge in a competitive market. We also know that the ILECs have very high operating leverage, face extensive competition, face the prospect of rapid technological change, and face regulatory risks that the average company in the S&P Industrials does not. Furthermore, we know that the betas of competitive publicly-traded telecommunications companies such as Level 3 have been in the range 1.5 to 2. Thus, the Commission should use a beta significantly greater than 1.0, although the exact value of beta would be difficult to estimate.

70. Third, the Commission should estimate the risk premium on the market portfolio either by applying the single-stage DCF model to the S&P Industrials or by using the Ibbotson Associates' long-run risk premium on stocks versus long-term Treasury bonds. These approaches would produce a risk premium in the range 7% to 9% above the yield on long-term Treasury bonds.

D. Capital Structure

1. Financial Theory and Practice Require the Use of Market Value Capital Structures to Estimate the Cost of Capital in Forward-Looking Cost Studies.

71.   The Commission should calculate the weighted average cost of capital to be used in forward-looking cost studies by analyzing the market-based percentages of debt and equity in the capital structures of competitive firms. Financial and economic theory requires the use of market value weights to calculate the weighted average cost of capital because market values are the best measures of the amounts of debt and equity investors have invested in the company on a going-forward basis. Furthermore, investors measure the risk and return on their investment portfolios using market value weights because they purchase a company's stocks and bonds at market price, not at book value. Thus, the return, and the risk or uncertainty of the return, can only be measured in terms of market values.

2. Book Value Capital Structures Should Be Rejected Because They Reflect Historical and Accounting Costs.

72.   Economists unanimously reject the use of book value capital structures to estimate the weighted average cost of capital because book values depend on arbitrary accounting conventions, are based on historical costs, and are inherently backward looking. I have taught corporate finance for more than 25 years, and I do not recall ever encountering a financial or economic text that recommended anything other than the use of market value weights to calculate a company's weighted average cost of capital.

73.   The use of a book value capital structure would be especially inappropriate for use in UNE cost studies because UNE cost studies are based on forward-looking economic costs rather than historical, embedded, or accounting costs. As the Commission stated in the *Local*

Competition Order, "Embedded costs are the costs that the incumbent LECs carry on their accounting books that reflect historical purchase prices, regulatory depreciation rates, system configurations, and operating procedures."[19] Furthermore, the FCC has specifically stated that UNE rates cannot be based on embedded or historical costs. See, for example, the *Local Competition Order* at 15844 ¶ 673: "In this section, we describe this forward-looking, cost-based pricing standard in detail. . . . [W]e address potential cost measures that must not be included in a TELRIC analysis, such as embedded (or historical) costs."

3. Market Value Capital Structures Are Not Volatile and Have Contained More than 75% Equity in Each of the Last Five Years.

74   CLECs have sometimes argued that the UNE cost of capital must be based on book value capital structures because market value capital structures are too volatile. This statement is simply incorrect. As shown below in Table 2, the average market value capital structure of the S&P Industrials has contained more than 80% equity and less than 20% debt in each of the last five years, and the average market value capital structure of the RBHCs has contained more than 76% equity.

Table 2

Year End	S&P Industrials			Telecommunications Companies		
	Market Value	Total Debt	%Equity	Market Value	Total Debt	%Equity
1998	5,401,709	600,676	90.0%	286,225	38,973	88.0%
1999	6,384,019	690,711	90.2%	349,250	46,051	88.4%
2000	6,081,755	791,732	88.5%	373,828	71,446	84.0%
2001	5,854,060	980,845	85.6%	331,916	77,804	81.0%
2002	4,590,691	1,119,674	80.4%	244,352	75,610	76.4%
Total	28,312,233	4,183,637	87.1%	1,585,572	309,884	83.7%

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[19]   *Local Competition Order* at 15819 ¶ 632.
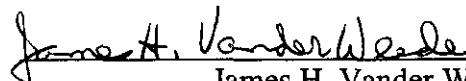
E. Summary

75.   In summary, the Commission should estimate the market cost of equity by applying a single-stage DCF model to the S&P Industrials, the cost of debt using the yield to maturity on A-rated industrial bonds, and the capital structure using the average market value capital structure of the S&P Industrials. In addition, the Commission should add a risk premium to the estimate of the market cost of capital to account for lease cancellation risk and sunk cost risk, and, to the extent applicable, additional regulatory risks created by its new pricing rules.

76.   This concludes my declaration.

Declaration of James H. Vander Weide

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 15th day of December, 2003.

James H. Vander Weide
James H. Vander Weide